

WHAT IS CLAIMED IS:

1. A signal transmission apparatus, comprising:
 - a quadrature modulator having an in-phase and quadrature input for receiving a complex-value payload signal, having a local oscillator signal input for receiving a complex-value signal at a carrier frequency, and having a signal output for providing a modulated transmission signal,
 - a digital signal processing unit coupled to the in-phase and quadrature input for supplying the complex-value payload signal; and
 - a feedback path which couples the signal output to the digital signal processing unit, the feedback path including an analog/digital converter for undersampling the modulated transmission signal with respect to the carrier frequency to produce an envelope of the modulated transmission signal.
2. The apparatus of Claim 1, wherein the quadrature modulator includes first and second Gilbert multipliers which respectively receive in-phase and quadrature components of the complex-value payload signal, and the quadrature modulator including an adder, the first and second Gilbert multipliers having respective outputs which are coupled to the adder.
- 20 3. The apparatus of Claim 1, including a bandpass filter connected between the signal output and the feedback path.

4. The apparatus of Claim 3, wherein the feedback path includes a low-pass filter connected upstream of the analog/digital converter.

5. The apparatus of Claim 1, wherein the feedback path includes a low-pass filter connected upstream of the analog/digital converter.

6. The apparatus of Claim 1, including first and second digital/analog converters coupled between the digital signal processing unit and the in-phase and quadrature input, the first and second digital/analog converters for respectively 10 supplying in-phase and quadrature components of the complex-value payload signal, and first and second low-pass filters respectively coupling the first and second digital/analog converters to the in-phase and quadrature input.

7. The apparatus of Claim 6, wherein the quadrature modulator 15 includes first and second Gilbert multipliers which respectively receive the in-phase and quadrature components of the complex-value payload signal, and the quadrature modulator including an adder, the first and second Gilbert multipliers having respective outputs which are coupled to the adder.

20 8. The apparatus of Claim 7, wherein the digital signal processing unit includes means for influencing an amplitude and phase angle of the complex-value payload signal as a function of the envelope of the modulated transmission signal.

9. The apparatus of Claim 8, wherein the digital signal processing unit is for storing preemphasis information determined as a function of the envelope of the modulated transmission signal.

5 10. The apparatus of Claim 7, wherein the digital signal processing unit is for storing preemphasis information determined as a function of the envelope of the modulated transmission signal.

10 11. The apparatus of Claim 6, wherein the digital signal processing unit includes means for influencing an amplitude and phase angle of the complex-value payload signal as a function of the envelope of the modulated transmission signal.

15 12. The apparatus of Claim 11, wherein the digital signal processing unit is for storing preemphasis information determined as a function of the envelope of the modulated transmission signal.

13. The apparatus of Claim 6, wherein the digital signal processing unit is for storing preemphasis information determined as a function of the envelope of the modulated transmission signal.

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14. The apparatus of Claim 1, wherein the digital signal processing unit is for storing preemphasis information determined as a function of the envelope of the modulated transmission signal.

15. The apparatus of Claim 14, wherein the quadrature modulator includes first and second Gilbert multipliers which respectively receive in-phase and quadrature components of the complex-value payload signal, and the quadrature modulator including an adder, the first and second Gilbert multipliers 5 having respective outputs which are coupled to the adder.

16. The apparatus of Claim 14, including a bandpass filter connected between the signal output and the feedback path.

10 17. The apparatus of Claim 14, wherein the feedback path includes a low-pass filter connected upstream of the analog/digital converter.

18. The apparatus of Claim 1, wherein the digital signal processing unit includes means for influencing an amplitude and phase angle of the complex-value 15 payload signal as a function of the envelope of the modulated transmission signal.

19. The apparatus of Claim 18, wherein the quadrature modulator includes first and second Gilbert multipliers which respectively receive in-phase and quadrature components of the complex-value payload signal, and the 20 quadrature modulator including an adder, the first and second Gilbert multipliers having respective outputs which are coupled to the adder.

20. The apparatus of Claim 18, including a bandpass filter connected between the signal output and the feedback path.

21. The apparatus of Claim 18, wherein the feedback path includes a low-pass filter connected upstream of the analog/digital converter.

5 22. The apparatus of Claim 1, provided as a mobile radio signal transmission apparatus.